AIR PRESSURE CAN CRUSHER

There are lots of different ways to crush a soda can... with your foot, in your hands, on your head. But nothing compares to the fun you’ll have doing the soda can implosion experiment. Just wait until the can goes “POP” and then you’ll see who has nerves of steel.

###### **Materials**

* Empty soda cans
* hot plate
* Cooking tongs
* Gloves
* Bowl
* Cold water

###### **EXPERIMENT**

1. Start by rinsing out the soda cans to remove any leftover soda goo.
2. Fill the bowl with cold water (the colder the better).
3. Add one generous tablespoon of water to the empty soda can (just enough to cover the bottom of the can).
4. Place the can on the burner of the stove while it is in the “OFF” position. It’s time for that adult to turn on the burner to heat the water. Soon you’ll hear the bubbling sound of the water boiling and you’ll see the water vapor rising from the can. Continue heating the can for one more minute.
5. It’s important to think through this next part before you do it. Here’s what's going to happen: you’re going to use the tongs to lift the can off of the burner, turn it upside down, and plunge the mouth of the can down into the bowl of water.
6. Get a good grip on the can near its bottom with the tongs held so that your hand is in the palm up position. Using one swift motion, lift the can off the burner, turn it upside down, and plunge it into the cold water. Don’t hesitate… just do it!
7. Wow... and you thought that you had nerves of steel. The can literally imploded. How does that work?
8. Don’t just sit there... get back to that stove and do it again! Each time you repeat the experiment, carefully observe what is happening in order to try to figure out how it works.

###### **HOW DOES IT WORK?**

Here’s the real scoop on the science of the imploding can. Before heating, the can was filled with water and air. By boiling the water, the water changed states from a liquid to a gas. This gas is called water vapor. The water vapor pushed the air that was originally inside the can out into the atmosphere. When the can was turned upside down and placed in the water, the water vapor condensed and turned back into the water. Water molecules in the liquid state are many times closer together than molecules in the gas state. All of the water vapor that filled up the inside of the can turned into only a drop or two of liquid, which took up much less space.

This small amount of water cannot exert much pressure on the inside walls of the can, so the pressure of the air pushing from the outside of the can is great enough to crush it. The sudden collapsing of an object toward its center is called an *implosion*. Nature wants things to be in a state of equilibrium or balance. To make the internal pressure of the can balance with the external pressure on the can, the can implodes. Hey, air pressure is powerful!

One more thing... if you watch very closely when you turn the can upside down, you'll see that the cold water in the bowl shoots up into the can. This is similar to what happens when you drink from a straw. Though we say we are "sucking" liquid up through the straw, we really aren't. Outside air pressure is pushing down on the surface of the liquid. When you reduce the pressure in your mouth (that sucking action) the outside pressure is greater than the pressure inside your mouth and the soda shoots through the straw and into our mouths. The same thing is true with the can. The force applied downward into the cold water pushes the water up into the can. To put it simply, science doesn't suck... it just pushes and pulls.